

## **Developing a Technical Basis for Reducing Risk from Arsenic Exposure in Water Resources Across the United States**

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Successful prevention of public exposure to arsenic in ground water resources impacted by natural sources or contaminated sites is dependent on scientifically based strategies for site remediation and water resource management. Research within the National Risk Management Research Laboratory, Ground Water and Ecosystems Restoration Division is directed toward building the fundamental basis for optimizing remediation technologies and management approaches to protect ground water resources. Through various in-house and extramural research efforts, the Division actively pursues three key areas addressing arsenic contamination in ground water systems:

1. elucidation of arsenic geochemistry at local and regional scales in various aqueous environments,
2. development of remediation technologies for subsurface systems, and
3. development of robust site characterization technologies for arsenic in liquid and solid matrices.

The first research need is supported through site-specific investigations in Massachusetts (Region 1) and Oklahoma (Region 6), examining the fate and transport of arsenic derived from anthropogenic and natural sources. This research provides fundamental process-level information to better design remedial technologies, as well as information critical for siting drinking water wells in aquifers where high arsenic concentrations may be a problem. The second research need is supported through site-specific investigations in Montana (Region 8) and South Carolina (Region 4), examining the use of subsurface permeable reactive barrier technology for intercepting arsenic in contaminant plumes. This research effort involves both laboratory and field-scale testing of iron- and carbon-based barrier materials. The last research need is supported through field and laboratory investigations into optimizing preservation and analytical speciation methods for redox-sensitive elements such as arsenic, iron, and sulfur in liquid and solid matrices. Research into analytical speciation of metals in solid matrices involves application of advanced spectroscopic techniques to validate commonly employed extraction methods. These projects are being carried out in cooperation with the respective Regional Offices and address site-specific technical support needs. The findings of these technical support efforts will be published in EPA Reports and are being communicated to both Regional and Programmatic representatives in the Waste and Drinking Water Program Areas via briefings and presentations at Agency-sponsored national meetings. This information provides the technical basis for continued policy development and regulatory enforcement. Together, these research components provide the Agency with a technically defensible approach to minimize risk to human health from arsenic exposure.